Revamping Close Air Support

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WITH THE US ARMY about to update Field Manual (FM) 100-5, *Operations*, and the US Navy in the process of developing its formal written doctrine, now is the time to rethink close air support (CAS). This is the time to clarify joint and service doctrine, which are not attuned with one another and must be brought into harmony.[1] Considerable doctrinal ambiguity and fundamental misconceptions about CAS persist.[2] The former chief of the Air Force's Current Doctrine Division and co-author of Air Force Manual 1-1, *Basic Aerospace Doctrine of the United States Air Force*, recapitulated the widely held Air Force notion of CAS in the November 1992 edition of *Military Review*: "Although CAS is considered the least effective application of aerospace forces, at times it may be the most critical in ensuring the success or survival of surface forces."[3] By contrast, the 1994 Air Force publication *Presentation to the Commission on Roles and Missions of the Armed Forces* depicted "a declining need for CAS," promoting "the elimination of CAS as a primary responsibility for the Air Force and Navy."[4] The *Roles and Missions* volume underscored the Air Force ambition to cast off its "full close air support capability."[5]

Does CAS represent a pivotal mission or not? Apparently, the Air Force is unsure. In the 1960s, Defense Secretary Robert McNamara, exasperated that the Air Force paid what he thought mere lip service to close air support, threatened to terminate the Air Force's CAS assignment altogether.[6] Piqued by the prospect of losing a mission, even one that had in practice become ancillary, the Air Force, in an effort to accommodate the secretary, accepted the Navy's A-7 project to develop a basic, relatively inexpensive aircraft designed primarily to support ground forces. Several voices at the time championed new CAS doctrine.[7] Little actually happened.

The United States cannot afford discord and lingering misconceptions about such an important operational task. With technology enlarging capabilities prodigiously, even exponentially, it seems ironic that some old debates recur.[8] And how are ground forces to regard the disharmony associated with close air support? Regrettably, precisely the way one Marine engineer officer did when he wrote, "In other words, if the Army and the Marines would avoid combat and stay out of there, the Air Force would not have to waste its aerospace forces in an ineffective manner."[9] Targeting the Navy, the same officer chided Rear Admiral Arthur Cebrowski for saying that "when talking about aircraft that cost as much as they do and an inventory as small as it can get, those are . . . precious commodities, and they're not going to be squandered just because some fellow calls for fire and wants to see that particular aircraft doing a profile that he read about in some book years ago."[10]

The US services continue to speak of merely "supporting" ground forces. Does it really matter whether aircraft are* supporting *the ground forces or* participating *in the ground battle? The difference is one of semantics.

Such interservice bickering about CAS is not new and has long since become tiresome. It echoes British army fault-finding early in World War II when troops stranded on the beaches of Dunkirk were dive-bombed while the Royal Air Force (RAF) was nowhere in sight—fighting beyond where the troops could see the aircraft. Such unpleasant memories die hard because the issues are emotion laden and politically charged. British troops felt they had been left in the lurch by the RAF and harbored resentments throughout the war.[11]

The upshot of service apprehensions in the United States has been perennial: unfading misgivings; ground forces safeguarding organic air assets; the Marines' practice of assigning an air squadron to each corps as the best method to achieve integration of air and ground fire. Services desire "their own aircraft" for troops' confidence, commanders' convenience and artillery's supplement. The Marine position has been perhaps the most telling—namely, that since Marines fight as a team, they should deploy as a team, which includes maintaining organic close air support. The logical implication is that US forces either fail to, or at least cannot be entrusted to, fight as a team. Unspoken recriminations can hardly inspire the American taxpayers with confidence. The 1993 Chairman of the Joint Chiefs of Staff *Report on the Roles, Missions, and Functions* asserted that "perhaps no aspect of roles and missions has spawned more debate since the Key West Agreement than the question of close air support."[12] The debate over CAS became stormy once again in early 1995, precipitated primarily by Air Force Chief of Staff Merrill A. McPeak's suggestion that the Army assume the CAS mission.[13]

Why should issues associated with CAS continue to be so prickly? Do the services really want to admit, however tacitly, that a seminal quandary involving interservice rivalry dating back to World War II persists? Not alleviating associated problems is inviting yet additional frictions in joint operations. The all-service commitment to fight jointly requires compromise on CAS issues. As in any compromise, each must yield on something, but in this instance all stand to gain. Technological development and doctrinal evolution offer a remedy to recurring CAS ills and this article provides a framework. A critical reexamination of CAS must address the following questions: What is CAS? Why new doctrine? What weapons platforms are to be included? Who is to command and control?

What is CAS?

The 1948 *Key West Agreement on Service Roles and Missions* defined CAS as "air action against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces."[14] "Air action against hostile targets" in 1948 and for many years thereafter involved fixed-wing aircraft. Modern air action can involve any one of a number of platforms or vehicles, including, above all, helicopters. Yet, service doctrine does not adequately reflect such technological change. Attesting to the growing capability of helicopters, observers over the past decade have advocated their doctrinal inclusion as CAS aircraft. Indeed, the 1993 *Report on Roles, Missions, and Functions* stated, "Today's highly capable attack helicopters can provide timely and accurate fire support to ground troops engaged in battle . . . While this robust capability in fact adds to the close air support fight, it has never been recognized in the CAS definition and is not embedded in service doctrine."[15] The joint doctrinal publication JP 3-09.3, *Joint Tactics, Techniques, and Procedures for Close Air Support*, issued in early 1996, contains two sections devoted to discussions of rotary-wing CAS.[16]

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Only service parochialism prevents assigning helicopters a major CAS role. Resistance to such inclusion in the CAS mission originates with the ground forces and coalesces around an unwillingness to relinquish control of helicopters as organic ground maneuver units.[17]

Ground troops' concern about air attack in forward areas is understandable. Believing that somehow "their own airmen" can be called in like artillery fire may seem comforting, but the reluctance to designate attack helicopters as potential CAS assets perpetuates something of a sham. Senior Army generals emphasize that helicopters can be, and in fact are, employed for CAS. For example, General Frederick Franks, commander of the US VII Corps during the Gulf War, wrote that "attack helicopters were counted on for the closest of the CAS (in the Gulf War), since their ability to maneuver and keep close contact with ground forces made them the most suitable for attacking targets closest to the front lines."[18] While wholly persuasive, this position is not yet anchored in Army doctrine. Nor do the services always concur on the facets of the mission.

Why the confusion? The definitional and substantive ambiguities actually predate Air Force autonomy in 1947. Before the Korean War, what the Air Force termed "close air support" the Marines

and Navy considered "deep support."[19] Close troop support in the Air Force perception would be furnished primarily with artillery and rockets—

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Army assets for the most part. The interface problem has lingered ever since.

For its part, the Marine Corps defines CAS as "effective air action against hostile targets located close to friendly forces . . . like close-in Fire Support, CAS requires detailed integration with a friendly ground force's fire and maneuver."[20] What, though, does *close* mean in this context? The services have not always been able to agree on that either. Franks described fixed-wing CAS as extending out some 40 miles from the front lines, an uncommon depiction, certainly by Marine criteria and even by the Army's.[21] The Air Force would characterize this as an interdiction mission.

Why New Doctrine?

Doctrine might be defined as a body of theory that "describes the environment within which the Armed Forces of a state must operate and prescribes the methods and circumstances of their employment."[22] Doctrine is intended to foster likemindedness and military effectiveness; doctrinal provisions are generalizations gleaned from past experiences about what functions well.[23] To a certain extent, lingering confusion about CAS might reflect the misuse of the very concept of doctrine.

CAS doctrine should clarify how the main principles of air warfare apply in this specific instance and delineate the chief missions of CAS. This done, doctrine should be geared to resolving the remaining issues of CAS. Generalization is, of course, always a somewhat risky proposition, especially if one overgeneralizes about isolated historical incidents. Most observers would suggest, however, that principles of air warfare are largely timeless, notwithstanding technological and scientific developments. These enduring principles are maintenance of offensive power, concentration of force and protection of base.

The dual aspect of the first two bespeaks the distinctiveness of CAS operations: offensive power and force concentration involve not only the air operations themselves but also the contribution they make to the ground operations. With respect to the first, CAS should provide ground forces crucial security from air attack, especially during offensive operations. But it is also intended to thwart and disrupt enemy counterattacks, allowing one's own side to retain the initiative. With respect to concentration, CAS aircraft should focus maximum pressure on the enemy. At the same time, the security accorded by CAS permits the concentration of friendly ground forces for offensive operations.

With respect to mission, tactical air forces generally are intended to foster a battlespace advantage and protect vital supply lines. Every CAS mission must be closely integrated with the fire and movement of those supported ground forces to furnish overhead security and allowing land forces greater freedom to maneuver and fight. The argument here to reorient assets presupposes reoriented tactics, which is a call for doctrinal change. Service doctrine must be brought in line with joint doctrine, and with respect to CAS, the discrepancy is glaring. Joint Publication 1-02, DOD *Dictionary of Military and Associated Terms*, defines CAS as "air action by fixed- and rotary-wing aircraft against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces." This definition makes specific reference to attack helicopters, while service doctrine still does not. Joint doctrine fails to resolve a number of salient issues, for example, those regarding command and control or mission category. Joint Publication 3-56.1, *Command and Control for Joint Air Operations*, specifies that joint CAS is conducted through joint air operations or, in the case of rotary-wing aircraft, through the "establishment of a command relationship between components," a vague description.

So what is to be done from a doctrinal standpoint? Doctrine should reflect the realities of the modern, joint battlefield, not the realities of inside-the-Beltway politics. Despairing in the wake of current contention, one observer quipped: "You can't divvy up the battlespace and have union cards saying I can do only CAS or deep strike."[24] Another, criticizing recent tactical "deep strike" proposals whereby land forces would fight up to the Fire Support Coordination Line (FSCL) and air forces would control

what lies beyond, asserted: "this is segregation, not joint operations."[25]

Capable of multifaceted deployment and three-dimension mobility, aircraft offer considerable mission flexibility. The maneuverability, speed and range of aircraft permit them to engage targets other supporting weapon systems cannot and duplicating CAS efforts helps ensure their success.[26] Few serious observers would challenge the *Roles, Missions and Functions* assertion that troops locked in combat with the enemy must receive all the fire support they need. Deciding who provides CAS must be kept separate, insofar as possible, from which type of aircraft. As odd as it may sound in some corners, each service should retain a CAS mission despite diminishing resources.

Indeed, the Joint Chiefs' 1989 *Roles and Functions of the Armed Forces* and the 1993 *Roles, Mission, and Functions* endorse this notion, designating CAS as a primary mission of all services.[27] Such retention presupposes that the Army and Air Force train jointly, coordinate their efforts and ascertain what resources are best devoted to the CAS mission. A careful review of Navy and Marine aircraft with virtually identical missions, such as the F/A-18, might be in order but should not automatically lead to a reduction in force. Here also, joint training emphasis will provide a broader picture of the battlespace and help earmark assets for close air support.

Although the presence of several air forces in the same battlespace has caused organizational problems in the past and presents a potential difficulty in the future, joint training and likemindedness about warfighting should overcome major difficulties. In a joint operation, aircraft should be placed under the control of a Joint Force Air Component Commander (JFACC), above all because such command would facilitate decisions regarding air tasking prioritization by those who understand air power.[28] A habitual concern is that joint and service duties are too demanding for one individual or one headquarters.[29] This, of course, is scarcely a new problem, and technological advancement is not making command tasks any easier. But the advantage of the JFACC position in close air support is that the designated individual is a specialist in air operations. Interpreting current trends, Martin van Creveld believes that air assets should no longer be grouped into a separate service but increasingly revert back to sea and land services.[30]

Those service relationships can help refute the charge, right or wrong, that an aviator in an airplane does not easily grasp the logic of a landscape beneath him.[31] For example, Marine aviation close air support has on occasion "embarrassed" the Air Force.[32] Because all Marine aviators are part of a spirited team in which everyone is a rifleman first, they tend to have, and are perceived by ground troops to have, more empathy for ground forces. A modicum of competition might contribute to a broader sense of mission, while troops on the ground maintain a certain psychological edge by knowing "their" aviators are furnishing support.

Field Artillery Journal

A 75th Fighter Squadron A-10 in joint air attack operations with a 229th Aviation Brigade Apache, Fort Bragg, North Carolina.

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And since all services have experience with CAS, each presumably would bring something to the table. Joint Pub 3-09.3 discusses this latter point.[33]

What Platforms?

Far and away the most important question under this heading: Is close air support by fast, high- performance aircraft still necessary in the era of precision-guided munitions? Not usually. High-performance fixed-wing aircraft and their highly trained crews are generally considered too valuable to be employed as CAS assets. Fighters designed for speed have smaller payloads than ground-attack aircraft, and few are equipped with the precision- guided munitions that constitute the most effective close air support instruments. Moreover, their use in CAS is a highly inefficient use of scarce defense resources. For example, during the Persian Gulf War, fully 70 percent of Marine aircraft sorties were flown as CAS. Later analysis indicated that merely 14 percent of these sorties were flown short of the Fire Support Coordination Line (FSCL), and an even smaller percentage was flown against targets close to friendly forces.[34] Hence, the quantity of genuine CAS sorties was remarkably low in comparison to the number of other missions flown by fast fixed-wing aircraft.[35]

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This is by no means to discount the role of CAS, nor is it to belittle the ground forces by implying they should somehow miraculously stay out of harm's way. Neither is it to assume the drastic and controversial position of the former Air Force chief of staff who wished to shed the CAS mission altogether and recommended that the Army shoulder it. It is, rather, to acknowledge that doctrine must reflect technological development in a several-fold sense. Helicopters can provide timely and accurate fire support to ground troops, although the relative contributions of fixed- and rotary-wing assets have yet to be sufficiently analyzed. Although beyond the scope of the discussion here, this issue requires additional analysis. What are to be the criteria of acceptability?

Given the capability of modern air defenses, using fixed-wing aircraft for ground-operations support entails risk far too great in most cases. High-performance aircraft are scarce, expensive, and, above all, essential to interdiction missions. Some argue that the only real mission of fast fixed-wing aircraft is to fight other such aircraft; van Creveld has gone so far as to suggest that maintaining a force of super-expensive machines to give battle to other similar machines makes no sense.[36] On the forward edge of the battlespace where enemy air defenses are potent and alerted, conditions are trying for these aircraft. Over one-third of coalition fixed-wing aircraft lost in the Gulf War were engaged in CAS or an affiliated mission.[37]

Worse, the short loiter times of high-performance aircraft leave troops unsheltered for extended periods so doctrine should focus on the most efficient use of the entire inventory of potential assets. Few aircraft can be earmarked permanently for a particular role; indeed, an advantage of any aircraft is its mission flexibility.[38] Fixed-wing aircraft may need to be employed as CAS assets in certain contingencies.

By failing to correct procedural uncertainties and differences in command and control, the United States is not playing to its strong suit—technological superiority. Resisting battlespace command centralization of highly capable rotary-wing assets precludes their most efficacious employment. Technological advancement in other areas—surface-to-surface missiles, vertical/short take-off and landing (VSTOL) aircraft has allowed their more effective use very close to friendly ground forces.[39] VSTOL aircraft can furnish close support to the ground troops and have the added advantage of serving in an interceptor role as well. Able to operate from both carriers and temporary landing fields on shore, they can respond to requests for close air support in a relatively short time, usually much sooner than conventional aircraft. The cost of such forward deployment with the ensuing rapid response time takes the form of relatively small engines and light airframes, which in turn translates into less ordnance. Of course, VSTOL aircraft are expensive assets also, necessitating circumspection about their employment near the FSCL.

In a sense, then, we are encountering what would seem to be an irresistible combination of principle and pragmatism. Designating high-performance

McDonnell Douglas

An F-15 Eagle taxies prior to takeoff with an atypical load of general purpose bombs.

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fixed-wing aircraft as CAS assets frequently entails injudicious risk—which is largely unnecessary since other far less costly systems can perform the same missions. The logic seems almost incontrovertible.

Yet the current episodes of the CAS controversy produce an uncomfortable sense of *deja vu*. Over the years, the Air Force has been criticized for neglecting CAS in training, doctrine and weapon systems development. One DOD official remarked somewhat off the cuff that the service "just has not been paying attention to this mission."[40] The Air Force has now slotted the F-16 as its chief CAS platform for the future.[41] The F-16 was designed as a fast, lightweight fighter and only later assigned a ground-attack mission. Reassessing the hardware is crucial. Basic, relatively slow fixed-wing aircraft still have considerable utility—the oft-disparaged A-10 "Warthog" is a case in point. This survivable "armor buster" fared well in the Gulf War and will soldier on in the new century as a CAS platform. Unfortunately, no follow-on to the A-10 is planned, even though the search for a replacement platform began in the mid-1980s.[42]

The 1960s' initiative to acquire the A-10 came from the Army. The Air Force was never receptive to building the A-10 because its "sluggishness" and want of true air-to-air capability were fatal flaws in Air Force eyes.[43] In the 1980s, Air Force Secretary Verne Orr realized his service was keen on new fighter development but avoiding the requirement to replace the A-10 and maintain the attendant mission, he stipulated that "until the Air Force makes good on its promise to provide the Army with close air support . . . the advanced tactical fighter (ATF) will be relegated to the bottom of the service's list

of tactical priorities."[44]

The A-10 has a proven track record of close air support. Sluggishness renders it more vulnerable, but for the CAS mission, lengthy loiter time arguably far outweighs this drawback. Although it is not a fighter-interceptor, it is a jet aircraft of unique design.[45] To improve survivability from ground fire, it has redundant, armor-protected flight control systems in the wings and tail unit. It features a bullet-proof windscreen and a titanium cockpit area capable of withstanding 23mm hits. Its dual engines are spaced apart and set high on the rear of the fuselage, significantly improving the chances of maintaining power even after severe airframe damage.[46]

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Likewise, the case for helicopters as such would seem to be made. Employed in a particular mode, helicopters have functioned as CAS platforms in all but service doctrine for some years. Overcoming the current doctrinal impasse while integrating pertinent past lessons of air warfare is instrumental to preparing for what Paul Bracken refers to as the "military after next."[47] Follow-on systems will offer new operational possibilities, probably in line with Admiral Arthur Cebrowski's recent counsel that the military start finding ways to provide close air support with something other than manned aircraft.[48] Remotely Piloted Vehicles (RPVs), operating in conjunction with sensors and satellites, will likely be prominent in the future battlespace, and future guidance technology will permit precision strikes from considerable stand-off distances.[49] Doctrine should help envision and operate in that future battlespace.

Today's misunderstanding of CAS might be so widespread, or perhaps the associated issues so laden with political baggage, that at least one fairly straightforward point has been lost: helicopters' psychological effect on both friendly and enemy forces.[50] Their visible, sustained presence, often more palpable because of prolonged loiter time, should assuage ground forces' immutable fear of being deserted by their own air forces and left to the mercies of hostile aircraft. Helicopters, conceivably in conjunction with evolving unmanned systems, could provide support to ground forces akin to the proverbial "cab rank" (allied system for forward air support that enabled ground-based units to call up attack aircraft on short notice). True, soldiers may fear that helicopters would be redeployed to another area by the central command, but Marines might harbor less concern about attack aircraft being unavailable at crucial moments.[51] On the other hand, though, helicopters have the distinct ability to hover and can use unimproved facilities far forward in the battle area. The psychological effect upon enemy forces represents the other side of the equation. The lingering presence of friendly rotary-wing aircraft underscores the commitment and ability to integrate air missions with the movement and fire of the ground forces.

Who Should Command and Control?

Land, sea and air engagement invariably prompts another crucial question: Who is in charge?[52] Messages about apportionment and allocation in previous conflicts must be captured. During both World War II and Korea, forces intheater usually agreed that the joint task force (JTF) commander, advised by the effective air component commander, would decide virtually every day what amounts of available aircraft would be used for close air support, interdiction and air superiority.[53] This apportionment and allocation procedure usually accorded maximum protection to all engaged forces and offered the best possibility of accomplishing the mission. While aircraft were reallocated according to the decisions of the JTF commander, airmen maintained centralized control of air assets, while the overall commander, who presumably had the best picture of the battlespace, determined how to use aircraft most effectively. With the ground commanders involved in decision-making, troops received some assurance that air protection would be provided.[54]

This model for close air support might be employed in revitalized form, as JP 3-09.3 implies. Aircraft performing CAS, to include helicopters, should be placed under the centralized control of the JFACC, who provides advice and is directly responsible to the Joint Force Commander (JFC). The *Roles and Missions* Commissions largely skirted these and associated issues, although better guidance is now furnished in JP 3-09.3. This 1995 joint doc-

trinal publication represents a major step in the right direction, but doctrine does not adequately reflect all the time-tested apportionment and allocation procedures described above. Both service and joint doctrine should do this.

Two major drawbacks stem from maintaining systems that perform close air support as inherently organic to ground units. First, without JFACC control, these assets could remain idle in times of genuine need in particular sectors of the battlespace. Second, and what is in fact the other side of the same coin, they may be overused by ground units fearing air attack or overestimating an air threat. Centralized CAS control, exercised initially through the JFACC, but ultimately through the JFC, as was often demonstrated in World War II, alleviates such difficulties in the main. Presumably the JFC has the most complete picture of the battlespace, and he determines crucial target priorities. Unless the operation dictates otherwise, maintaining the fighting edge in the overall battlespace plainly supersedes an advantage in any one sector. Alluding to this point, joint doctrine now states that "the JFC provides guidance on intent and vision with respect to the use of air assets to support the campaign plan."[55]

Much can be said for this stratagem of reallocation and apportionment. The 1995 joint publication on CAS would seem to be clear on the following matter: "The amount of air support that will be dedicated to joint CAS is decided by the JFC in the air apportionment decision."[56] Although each service might have to yield on particular points, all concerned parties stand to gain by rectifying a festering problem. Above all, the proposal offers to rescue CAS from being an orphan in the roles and missions debate.[57] As recently as 1995, just before the release of JP 3-09.3, and two years after the *Report on Roles, Missions, and Functions* designated CAS as a primary mission area for all services, the Air Force still urged the Army to assume the CAS role. The Army, averse to take on "new" missions, shied away.

Intermittently, both services have been inclined to criticize the Marines for maintaining a duplicate air force to provide their own CAS. This renewed debate strengthened Marine suspicions that the other services would leave them in the lurch, further strengthening the time-honored Marine dictum that "forces fighting as a team should deploy as a team." Marines note that the system broke down miserably in Vietnam, with the Air Force once again unprepared to provide the necessary close air support to

US Air Force

A "murderers' row" of Warthogs at an Air Force Base in Europe.

The oft-disparaged A-10 "Warthog" fared well in the Gulf War and will soldier on in the new century as a CAS platform. But no follow-on to the A-10 is planned, even though the search for a replacement platform began in the mid-1980s. The 1960s' initiative to acquire the A-10 came from the Army. The Air Force was never receptive to building the A-10 because its "sluggishness" and want of true air-to-air capability were fatal flaws in Air Force eyes.

the troops and the Army continuing to insist that the ground commander should assume operational control of close support aircraft. By the Pentagon's own admission, doctrinal differences and interservice polemics have significantly contributed to misunderstandings within and outside the military.[58]

Following the 1973 Arab-Israeli War, Israel changed its air doctrine to specify that the air force should "support the ground forces" to that it should "participate in the ground battle."[59] The US services continue to speak of merely "supporting" ground forces. Does it really matter whether aircraft are *supporting* the ground forces or *participating* in the ground battle? The difference is one of semantics. But since CAS is designated a "primary mission area" for all services, the word "support" has unfortunate connotations for warfighters. Perhaps the next doctrinal step should be to follow the Israeli example. Commanders must have the flexibility to reallocate air assets from one part of the battlespace to another and to reassign them from one mission to another, as circumstances dictate. All doctrine must assure the commander, air components and ground troops optimal CAS. ***MR***

NOTES

1. The publication of FM 100-5 in 1993 marked the culmination of a two-year debate during which the Army examined the implications of a new strategic era. See *Military Review* (December 1993). The entire edition is devoted to this keystone doctrine. Discussion of several cardinal issues should begin again.
2. This point is made cogently, although without much tact, by Carlton W. Meyer, "For Guys on the Ground," *Armed Forces Journal* (June 1995), 58-59.
3. Price T. Bingham, "The Air Force's New Doctrine," *Military Review* (November 1992), 18. Air Force Manual 1-1, *Basic Aerospace Doctrine of the United States Air Force*, states: "CAS is the application of aerospace forces in support of the land component commander's objectives. At times, CAS may be the best force available to ensure the success or survival of surface forces. Since it provides direct support to friendly forces in contact, CAS requires close coordination from the theater and component levels to the tactical level of operations.
4. *Presentation to the Commission on Roles and Missions of the Armed Forces*, (Washington, DC: Chief of Staff, US Air Force, 1994), 103.
5. Ibid.
6. Thomas L. McNaugher, *New Weapons Old Politics* (Washington, DC: The Brookings Institution, 1989), 55.
7. For example, Richard G. Head, "Doctrinal Innovation and the A-7 Attack Aircraft Decisions," Richard G. Head and Ervin J. Rokke, eds., *American Defense Policy*, 3rd ed. (Baltimore: Johns Hopkins University Press, 1973), 431-45.
8. Thomas C. Linn, "Joint Operations: The Marine Perspective" *Joint Force Quarterly* (Winter 1995-96), 16.
9. Meyer, "For Guys on the Ground," 58.
10. Quoted in Ibid.
11. Norman L. Dodd, "Close Air Support for the Ground Forces," *Asian Defence Journal*, (June 1985), 22.
12. *Chairman of the Joint Chiefs of Staff Report on the Roles, Missions and Functions of the Armed Forces of the United States* (JCS: Washington, DC, 1993), 111- 15.
13. *Aviation Week and Space Technology*, 27 March 1995, 72.
14. *Roles, Missions and Functions of the Armed Forces*, 111-15. A definition paraphrased from several sources, including TACM-2-1, ATP 33, AAFCE Manual 802 would be: "Air attacks requested by the ground commander, against hostile targets which are in close proximity to friendly forces and which need the detailed integration of each air mission with the fire and movement of those forces." See Ian Madelin "What Is Close Air Support? *Armor* (July-August 1980), 18-21.
15. Ibid.
16. Joint Publication 3-09.3, *Joint Tactics, Techniques, and Procedures for Close Air Support* (Washington, DC: JCS, December, 1995), 11-7, IV-22-24.
17. This point was made persuasively by Ray Oden, Robert Harvey and Rich Huntoon in an unpublished manuscript dealing with CAS written in 1995 at the Armed Forces Staff College.
18. *Presentation to the Commission of Roles and Missions of the Armed Forces*, 118.
19. James A. Winnefeld and Dana J. Johnson, *Joint Air Operations* (Annapolis: Naval Institute Press, 1993), 43-44.
20. *Fleet Marine Forces Manual 5-40 Offensive Air Operations* (Washington, DC: Department of the Navy, 1992), 1-2.
21. *Aviation Warfighting Treatise* (Department of the Army: US Army Aviation School, 1993), 18.
22. Gregory Flynn, ed., *Soviet Military Doctrine and Western Policy* (London: Routledge, 1989), 4.
23. I. B. Holley, Jr., "A Retrospective on Close Air Support," Benjamin Franklin Cooling, ed., *Close Air Support*, (Washington, D.C.: Office of Air Force History, 1990), 545.
24. *Aviation Week and Space Technology*, 27 March 1995, 72.
25. Linn, "Joint Operations: The Marine Perspective," 17.
26. For a broader discussion of this point, see the chapter entitled "The Material Bias: Why We Need More Fraud, Waste and Mismanagement," in Edward N. Luttwak, *The Pentagon and the Art of War* (New York: Simon and Schuster, 1985), 130-56. According to Luttwak, "[The] outputs that count in war are very particular and very different from the outputs that count in peacetime, and when civilian notions of efficiency are applied, the difference is routinely overlooked." See also Heike Hasenauer, "Air-Ground School," *Soldiers* (April 1996), 24-27.
27. *Roles and Functions of the Armed Forces: A Report to the Secretary of Defense* (Washington, DC: Joint Chiefs of Staff, 1989), 3; and 1993 *Roles, Missions, and Functions* (Washington, DC: Joint Chiefs of Staff, 1993).
28. Phillip S. Meilinger, *10 Propositions Regarding Air Power* (Washington, DC: Air Force History and Museums Program, 1995), 55; see also Joint Publication 3-09.3, 1-7.
29. See Linn, "Joint Operations: The Marine Perspective," 17.
30. Martin van Creveld, "The Rise and Fall of Air Power," *Military History Quarterly* (Spring 1996), 81.
31. Quoted in Meyer, "For the Guys on the Ground," 58.
32. Holley, "A Retrospective on Close Air Support," 542.
33. Joint Publication 3-09.3, 1-3.
34. *Presentation to the Commission of Roles and Missions of the Armed Forces*, *117*.
35. I am indebted to an Armed Forces Staff College Study group led by Ray Oden for this observation. See also *Presentation to the Commission of Roles and Missions of the Armed Forces*, 117.
36. Van Creveld, "The Rise and Fall of Air Power," 81.
37. Meyer, "For Guys on the Ground," 58.
38. See Meilinger, *10 Propositions Regarding Air Power*, 28-38.
39. For a discussion, see Bruce Myles, *Jump Jet* (San Rafael, CA: Presidio Press, 1978), 159-184.
40. Quoted in McNaugher, *New Weapons Old Politics*, 147.
41. See for example *Presentation to the Commission of Roles and Missions of the Armed Forces*, 109.
42. McNaugher, *New Weapons Old Politics*, 147.
43. Meyer, "For the Guys on the Ground," 59.
44. Quoted in McNaugher, *New Weapons Old Politics*, 147.
45. See Tom Gervasi, *Arsenal of Democracy* (New York: Grove Press, 1977), 48-49.
46. For a detailed description, see Jane's *All the World's Aircraft 1983-84* (London: Jane's Publishing Group, 1984), 375-76.
47. Paul Bracken, "The Military After Next," *The Washington Quarterly* (Autumn 1993), 157-74. This article promotes the use of a new concept, "the military after next," reflecting fundamental changes in the nature of warfare and the security environment.
48. Meyer, "For the Guys on the Ground," 58.
49. See Thomas G. Mahnken, "War in the Information Age," *Joint Force Quarterly*, (Winter 1995-96), 40.
50. One example of such political baggage is to be found in the Air Force's discomfort in the early 1960s when the Army began a program to arm its fixed-wing Mohawk aircraft with bombracks and machineguns. The Air Force insisted the Army stay out of the aerial fire support business. See Robert H. Scales, Jr., *Firepower in Limited War* (Washington, DC: National Defense University Press, 1993), 20.
51. Meyer expresses what is probably a widely-held Marine concern in "For the Guys on the Ground," 58. The implications for rotary-wing aircraft seem to escape him, though.
52. Linn, "Joint Operations: The Marine Perspective," 16.
53. Holley, "A Retrospective on Close Air Support," 543.
54. Madelin, "What Is Close Air Support?" 21.
55. Joint Publication, 3-09.3, III-1.
56. Ibid.
57. *Aviation Week and Space Technology*, 27 March 1995, 72.
58. *Roles, Missions, and Functions of the Armed Forces*, III-16.
59. Brereton Greenhous, "The Israeli Experience," Cooling, ed., *Close Air Support*, 527.

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